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ABSTRACT

A key component of the Angoff (W. Angoff, 1971) method for setting cut scores is the target examinee. Expert judges are asked, following training and discussion, to consider the ability and the likely performance of some subset of examinees and to then estimate, item by item, the likely performance of such examinees on the test for which a cut score is desired. Questions of interest for this study were: (1) how teachers who serve as judges on cut score panels describe the target examinee; (2) how teachers' descriptions of the target examinee compare to the definitions provided by workshop facilitators as a frame for the discussion of target performance; (3) how teachers' descriptions of the target examinee compare to the behavioral characteristics arrived at during the workshop training; and (4) how descriptions of the target examinee compare across workshops. The results of two studies involving panel groups of 22 fourth-grade teachers and 20 ninth-grade teachers suggest that teachers who serve as judges in cut score setting processes are influenced by the definitions and training used in the standard setting study. Further, it appears that some common notion of the just competent examinee might be at work. Future studies should examine teachers' conception of the just competent students (given the purpose of the intended use of the cut score) before, as well as after, Angoff workshops. An appendix contains salient phrases extracted from teacher responses to the study prompts. (SLD)

# A qualitative examination of teachers' conception of the just competent examinee in Angoff (1971) workshops.

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Paper presented at American Educational Research Association Annual Conference
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Abstract:

A key component of the Angoff (1971) method for setting cut scores is the target examinee. Expert judges are asked, following training and discussion, to consider the ability and the likely performance of some subset of examinees and to then estimate, item by item, the performance of such examinees on a the test for which a cut score is desired.

Questions of interest in this study are: 1) How do teachers who serve as judges on cut score setting panels describe the target examinee? 2) How do teachers' descriptions of the target examinee compare to the definitions provided by workshop facilitators as a frame for a discussion of target performance? 3) How do teachers' descriptions of the target examinee compare to the behavioral characteristics arrived at during workshop training? 4) How do descriptions of the target examinee compare across workshops? The results of this study suggest that teachers who serve as judges in cut score setting processes are influenced by the definitions and training used in the standard setting study. Further, it appears that some common notion of the just competent examinee might be at work. Future studies should examine teachers' conception of just competent students (given the purpose of the intended use of the cut score) before as well as after Angoff workshops.

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A key component of the Angoff (1971) method for setting cut scores is the target examinee. Expert judges are asked to consider the ability and the likely performance of some subset of examinees and to then estimate, item by item, the performance of such examinees on a the test for which a cut score is desired.

In school district settings, cut scores are often for the purpose of separating students into groups having different degrees of competency. Such a purpose raises the question: How is competence defined? In the Angoff (1971) method, and other judgmental methods that rely on the decisions of experts (in terms of test content and examinee characteristics) concerning the performance of 'just competent' examinees, a training process is employed that seeks to create a common understanding among experts (impaneled as judges) about the abilities and achievement characteristics of the just competent examinee (Berk, 1996; Mills et al., 1991; Reid, 1991).

This training process can employ an a priori definition of the just competent examinee. This definition is designed to spark a discussion (directed by a facilitator who is an expert in the cut score setting method) about the skills and performance of a just competent examinee relative to the domain of the test for which a cut score is desired, as defined by the test specification. This discussion is supposed to result in a common understanding among judges of the target examinee.

How experts who serve as judges in formalized cut score setting processes such as the Angoff (1971) characterize the just competent examinee has implications for understanding the level of competence that is defined by a cut score. This study asked experts to have in mind a specific student who would be classified as a just competent examinee as they made decisions on how such an examinee would perform on test items. This research encompassed two cut score setting studies: A study for the purpose of setting a cut score for a Grade 4 Reading proficiency examination, and a study for the purpose of setting a cut score for a High School Mathematics proficiency test.

Questions of interest in this research are: 1) How do teachers who serve as judges on cut score setting panels describe the target examinee? 2) How do teachers' descriptions of the target examinee compare to the definitions provided by workshop facilitators as a frame for a discussion of target performance? 3) How do teachers' descriptions of the target examinee compare to the behavioral characteristics arrived at during workshop training? 4) How do descriptions of the target examinee compare across workshops?

The target examinees in these studies were students who were "barely proficient" in the domain of interest.

## Grade 4 Reading

Twenty-two 4th grade teachers were selected from among 4th grade teachers in a large Midwestern school district to participate in an Angoff (1971) cut score setting workshop. The purpose of the workshop was to set a cut score on a reading examination that would identify 4th grade students who need special instructional interventions in reading beyond what the regular classroom teacher can provide routinely.

As part of the workshop training, a definition of the target examinee was provided to teachers. The definition provided to teachers was:

> Barely proficient: The student can read some fourth grade level materials independently and can get by on other grade level materials with normal help from the teacher or other adult. We might view this student as one who can do most assigned tasks but only after careful introduction, help in some reading steps, and considerable effort on the student's part.

A discussion was directed by workshop facilitators for the purpose of defining the performance of such a student relative to the domain of reading skills defined by the specification of the test for which the cut score was to be set. This discussion resulted in a list of factors that were believed by teachers to make reading tasks either hard or easy for the target student as defined above. As teachers generated factors, they were recorded on a flip chart by the workshop facilitator. Following the discussion, the flip chart was removed, and teachers relied on their recollection of the discussion in their deliberation during the operational portions of the workshop. These factors are listed in Table 1.

Insert Table 1 here

As a device intended to aid the teachers in keeping in mind the barely proficient examinee as they made item performance estimates, workshop facilitators asked teachers to think of one student whom they knew who fit their notion of the barely proficient reader. Teachers were asked to think of how this student would respond to test items as they (the teachers) made judgments about the item performance of thebarely proficient reader.

At the end of the workshop after all operational tasks of the workshop were complete teachers were asked to provide a written description of the specific student whom they had in mind as the barely proficient reader. The following prompt was provided:

> During the workshop, you made ratings indicating how you expected a particular "target" student would perform on the test questions. We would like for you to describe, in your own words, the skills of this target student in relation to the test content.

Teachers did not have access to the flip-chart record of their earlier discussion of the barely proficient student as they responded to this prompt.

Results

Salient phrases extracted from the teachers' written responses to this prompt are resented in Appendix A Table 2 is a distillation of these phrases into conceptual groups. Five characteristics of the target student related to reading skills were mentioned by 3 or more teachers. Nine test-taking behaviors related to reading were mentioned by 3 or more teachers.

Insert Table 2 here

Comparing Table 1 to Table 2 reveals a similarity between the factors that teachers said influenced task difficulty and the target student that teachers had in mind as

they made item performance estimates. The factors listed in Table 1 that make tasks more difficult for the target examinee are most similar to the characteristics and test taking behaviors mentioned by teachers as attributes of the target examinee. Few of the easy tasks identified in the training discussion are mentioned by teachers as attributes of the barely proficient reader.

The target student described by the teachers who served as expert judges was one who will not do well on higher order tasks, has difficulty with long passages, has difficulty reading or understanding directions, will guess or randomly select answers when faced with difficult questions, will not refer to the reading passage when answering questions and will do best on tasks when familiar with or interested in the content of the reading passage. This student has poor vocabulary and is easily distracted. The premise of the process is that this student is a proficient, although barely, reader.

## High school Math

Twenty 9th grade mathematics teachers were selected from among 9th grade teachers in a large Midwestern school district to participate in an Angoff (1971) standard setting workshop. The purpose of the workshop was to set a cut score that would indicate proficiency in high school mathematics.

The process of training and discussion was the same as for the 4th grade reading Angoff workshop, except that the following definition of just competent was provided:

> Barely Master: The barely master student is able to solve some multistep application using a numerical or 'brute force' method, but has difficulty using traditional algebraic methods. The barely master student can solve most algebraic, geometric, or simple arithmetic applications that are not embedded in context (e.g., percent, proportion, probability, mean). The "typical" barely master student in ninth grade algebra demonstrates the skills necessary to earn a grade of "C+" or "C". Or, the "typical" barely master student is a very strong transition math student, e.g., a student who demonstrates the skills necessary to earn of grade of "A" [in a transition math class].

This description provided to teachers as a basis for identifying the student who is proficient in high school math skills was much more detailed than the fourth grade reading definition.

The discussion that was designed to yield a more specific description of the target examinee's skills relative to the test domain resulted in a list of factors that were believed by teachers to make math tasks either hard or easy for the target student (the barely master student). As in the previously described study, teacher generated factors were recorded on a flip chart by the workshop facilitator. Following the discussion, the flip chart was removed, and teachers relied on their recollection of the discussion in their deliberation during the operational portions of the workshop. The factors identified by teachers are listed in Table 3.

Insert Table 3 here

At the end of the workshop, teachers were asked to provide a description of the student whom they had in mind as the barely master math student. The following prompt was provided:

> During the workshop, you made ratings indicating how you expected a particular "target" student would perform on the test questions. We would like for you to describe, in your own words, the skills of this target student in relation to the test content.

Teachers did not have access to the flip-chart record of their earlier discussion of the barely proficient student as they responded to this prompt.

## Results

Salient phrases extracted from 20 written responses to this prompt are presented in Appendix B. Table 4 is a distillation of these phrases into conceptual groups. Three characteristics of the target student related to math skills were mentioned by 7 or 8 teachers. Six test-taking behaviors related to reading were mentioned by 4 or more teachers. Teachers in this workshop were more homogeneous than the 4th grade reading group in describing the barely master student.

Insert Table 4 here

Comparing Table 3 to Table 4 indicates that the teachers' post-workshop description of the barely master math student reflects the characteristics listed in the training discussion of the tasks that would be hard or easy for the barely master math student. For example, in Table 3 complex, multi-step problems and equations are listed as examples of difficult tasks. Nine teachers described the barely master student they had in mind as having difficulty with abstract and complex problems. Further, the characteristics derived from teacher descriptions of the barely master student reflect the detailed definition of the barely master student provided to them in the training portion of the workshop. For example, the definition indicates that the barely master student masters most geometric, algebraic and simple arithmetic problems not imbedded in context. Teachers described the barely master student they had in mind as having good basic skills, but also as having difficulty with translating story problems to math concepts.

The target student described by the teachers was one who had short term retention of skills and difficulty recalling appropriate formulas, low ability to generalize learned concepts, but had good basic skills. In terms of test-taking behavior, this student would overlook details, not check answers for appropriateness, have difficulty with story and complex problems, and would rely on a calculator for answers. This student would best perform on concrete problems.

## Discussion

Comparison of post-workshop descriptions of the just proficient student to the definition of the target examinee and to the results of a training exercise designed to elicit behavioral characteristics of the target examinee in an Angoff standard setting workshop suggests that the definition and discussion of the target examinee influences judges' perception of the just competent (barely proficient, barely master) student. When the description of the barely proficient student is less definitive, as in the case of the 4th grade reading workshop, teachers' descriptions of the barely proficient student were more varied than when the description provided by the workshop facilitators was more definitive in terms of expected behavior (as in the high school math workshop). This

finding suggests that a priori definitions[1] that describe the target examinee in certain ways and more or less exactly can substantially influence judges' operational notion of target competence.

A study by Impara, Giraud, and Plake (2000) supports the notion that definitions provided to cut score judges can influence cut score outcome. Impara et al. compared the cut score outcome for a set of judges who made item performance judgments on the same test in two separate Angoff workshops where the definition of barely master differed. The judges in the Impara et al. study were a subset of the judges used in the current study who had participated in an earlier workshop. The cut score outcome derived from these judges' item performance judgments differed with the definition of barely master.

Comparisons of the definitions of the just competent student constructed out of the teachers' post workshop descriptions reveals similarities between the two quite different workshops (see Table 5). The workshops differed in terms of the content being judged, the purpose of the cut score to be set, grade level, and school district. The definitions of the just competent student were similar in terms of the test taking behaviors expected of the students (attention to detail, checking their work), and also in terms of the ability of the students to process difficult (in terms of complexity and level of abstraction) items. These similarities might result from some idea of competence that is common across teachers who serve as judges. That is, the "just competent student" may have similar characteristics under almost any circumstances. An alternative explanation is that these similarities might result from some aspect of the workshop process that is constant as a result of common workshop facilitators (both workshops were designed and presented by the same facilitators).

Insert Table 5 here

Limitations

This study examined only two Angoff (1971) workshops, conducted by the same facilitators. Including multiple workshops conducted by different facilitators would increase confidence in these findings.

Collecting descriptions of the target examinee after the workshops leaves questions about how teachers conceived of the target examinee before being exposed to the definitions and training of the workshops. More revealing results would be obtained from both pre and post collection of data.

## Conclusions

This study suggests that teachers who serve as judges in cut score setting processes are influenced by the definitions and training used in the standard setting study. Further, it appears that some common notion of the just competent examinee might be at work. Future studies should examine teachers' conception of just competent students (given the purpose of the intended use of the cut score) before as well as after Angoff workshops.

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Table 1. Factors identified by teachers that affect the ease or difficulty of reading tasks for barely proficient 4th grade readers

| Factors that make tasks easier | Factors that make tasks more difficult |
|---|---|
| Picture clues | High level vocabulary |
| Word explained in sentence | Indirect explanation of word |
| Kid friendly terms | Terms not easily understood |
| High background knowledge | Low background knowledge |
| High interest in content | Low interest in content |
| Main idea clearly stated | Student must infer main idea |
| Advance organizer provided | Directions use unfamiliar terms |
| Short passages | Long passages |
| Simple questions | Complex questions |
| Concrete or literal questions | Inferential or abstract questions |

Table 2. Characteristics of the barely proficient reader that teachers reported thinking of as they made performance estimates, number and proportion of teachers who listed each characteristic

| Characteristic | No. of teachers | P. of teachers (n=22) |
|---|---|---|
| Poor vocabulary | 8 | .36 |
| Easily distracted (lack of focus) | 7 | .32 |
| Low in general knowledge | 4 | .18 |
| Poor reading comprehension | 4 | .18 |
| High in general knowledge | 3 | .14 |
| Test taking behavior | | |
| Poor performance on higher level tasks (e.g. making inferences, sorting details) | 11 | .50 |
| Difficulty with long passages | 9 | .41 |
| Does not read/understand directions | 7 | .32 |
| Answer with guess or randomly | 6 | .27 |
| Does not look back to reading passage for answers | 6 | .27 |
| Performs best when interested/knowledgeable | 6 | .27 |
| Hurries to get done | 5 | .23 |
| Written responses difficult | 4 | .18 |
| Good at short/concrete answers | 3 | .14 |

Table 3. Mathematics tasks identified by teachers that are easy or difficult for barely master students

| | Easy tasks | Difficult tasks |
|---|---|---|
| Algebra & Functions | One-step linear equations<br>Two step basic linear equations<br>Plot points in 2 dimensions | Derive equations<br>Complex, non-integer problems<br>Multi-step equations |
| Geometry | Find perimeter and area given formula<br>Find complimentary/supplementary angles<br>Classify polygons | Find area for 5 or more sided figures<br>Working without formula provided<br>Pythagorean theorem |
| Statistics Probability Measurement | Simple probability<br>Central tendency computation<br>Rounding<br>Read/Interpret graphs, charts | Common units transformation<br>Computational formulas<br>Applying formulas/problem solving<br>Choosing appropriate statistic<br>Conversion of units (metric/English) |

Table 4. Characteristics of the barely proficient math student that teachers thought of as they made performance estimates, number and proportion of teachers who listed each characteristic

| Characteristic | No. of teachers | P. of teachers (n=20) |
|---|---|---|
| Short term retention of skills, difficulty with recall of formulas | 7 | .35 |
| Low ability to generalize what is learned | 7 | .35 |
| Good basic math skills (number sense, basic algebra) | 8 | .40 |
| Test-taking behavior | | |
| Overlooks details | 5 | .25 |
| Will not check answers for appropriateness | 4 | .20 |
| Low ability to translate story problems to math concepts | 5 | .25 |
| Abstract/complex problems difficult | 9 | .45 |
| Good at concrete problems | 4 | .20 |
| Relys on calculator | 4 | .20 |

Table 5. Descriptions of target examinee constructed of teachers response to prompt.

Barely proficient 4th grade reader

The target student described by the teachers who served as expert judges was one who will not do well on higher order tasks, has difficulty with long passages, has difficulty reading or understanding directions, will guess or randomly select answers when faced with difficult questions, will not refer to the reading passage when answering questions and will do best on tasks when familiar with or interested in the content of the reading passage. This student has poor vocabulary and is easily distracted.

Barely master high school math student

The target student described by the teachers was one who has short-term retention of skills and difficulty recalling appropriate formulas, low ability to generalize learned concepts, but has good basic skills. In terms of test-taking behavior, this student will overlook details, not check answers for appropriateness, have difficulty with story and complex problems, and will rely on a calculator for answers. This student will best perform on concrete problems.

Appendix A. Salient phrases extracted from teacher response to prompt

1. male (gender of student that the teacher describes)
Easily Distracted
Needs reminders
Needs consequences
Tendency to avoid
Will not ask for help
Good common sense
Shares in class discussions

2. female
immature
wrapped up in what others are doing
difficult time staying focused
easily influenced by the actions of others
not a very long attention span
wants to be one of the first done
does not focus on work
reading and following printed instructions difficult
doesn't enjoy reading
doesn't posses a large vocabulary

3. female
would not look back into story for an answer
would encounter difficulty and not persist in thinking problems through
goal would be expedient completion rather than quality work
shades of meaning, summarizing, paraphrasing or sorting information would frustrate
reads over unknown words rather than finding meaning in the text
limited background knowledge, does not connect to what she reads

4. female
would get lost in advanced and long readings
lack of vocabulary
familiar is easier
fears tests
visual learner

5. male
likes short answers
always in a hurry to get done
sorting or inference questions would be incorrect
reads words but doesn't think about what they mean or how they form sentences
wouldn't read directions for each part, especially later in the test
limited background knowledge makes reading harder

6.female
sometimes does better than others
do better if interested
do better if test not too involved
just marks answers or gives up on long passages
attention span affects results
tendancy to ask for reassurance or clarification
need more literal test than abstract

7. male
hard working dedicated student
suffers from reading comprehension problems
difficulty with vocabulary
very hard to gain meaning from text
nearly impossible to look at higher order processing
reading the words instead of thinking about meaning
very frustrating to him

8. female
not highly motivated
takes longer to process information
frustrated by the length of each part
perhaps just mark answers
does not go back and check work
the first answer or no answer will do
directional question would be difficult
vocabulary interferes with success

9. female
hard worker
she read everything and tried her best
very literal
asks for confirmation on non-literal tasks
difficult if not topic she can relate to
difficult if abstract

10.male
low in comprehension
low in vocabulary
short term memory problems
former READ student
do better in study skills area than other areas
do better in shorter passages
inferences, theme, purpose are difficult
multiple meaning words would be difficult

11.female
inconsistent depending on attitude
needs to be comfortable
gets restless if she has to sit for a long time
test difficult because of length
difficult because of many different directions
trouble constructing answers
trouble paraphrasing, comparing, contrasting
very literal
very concrete
making inferences difficult

12.male
works quickly to get done
impulsive at times
writing about what he's read more difficult than telling
doesn't enjoy reading at home
do better with shorter passages
vocabulary of directions would interfere
does better with choices

13.female
good study skills
implied information, complex vocabulary make test difficult
substitutes her knowledge for what is in the reading
word attack skills are weak
would try her best
does not have strong speaking skills\
giving directions on a map would be impossible

14. female
not confident
make decisions without fully thinking about the problem
vocabulary will hinder test result
concerned about passage length
lacks background information on many subjects
lacks many experiences others have had
difficult to write summary
difficult to pick important details

15. female
would try hard but tire of details and length
would not go back and reread
would do better on passages of interest to her
would guess without reading

16. female
very quiet
reacts best to visual and verbal instruction
works hard, wants to succeed
can follow an example
sometimes lost in written instructions
reads well, but comprehension limited

17. male
struggles with reading
difficult time with inferences
good vocabulary
tries hard to succeed
easily frustrated
doesn't understand questions
will do well when interest is high
will do well when background knowledge is high
cannot connect new information

18. unknown
stays on task until complete
tries hard
strong experience background
decoding marginal
trouble with long passages
understands in discussion
confused first time through material
distracted easily

19. female
tries hard
often struggles
lacks confidence in new areas
good general knowledge
good general vocabulary
difficulty carrying over to other areas
not a risk taker
self concious about not feeling bright

20. male
reads fluently but doesn't always comprehend
processes slowly
doesn't always understand directions
difficulty with finding details
difficulty with making inferences
gets main ideas
putting ideas in writing not easy

21. male
difficult to sit still and focus
not concerned with right answer
rush through work to get done
some difficulty decoding
some difficulty understanding directions
main obstacle is being in right mood, slowing down to focus
easier to focus on stories of interest

22. female
doesn't like to read a lot of information at one time
difficult time answering inference questions
doesn't like to go back and reread information
-checking work is something she doesn't like to do.

Appendix B. Salient phrases extracted from teacher response to prompt

---

1. (gender of target examinee) unknown
beginning algebra class
not a test taker
does well on homework
participates during class
experiences problems remembering 2-3 weeks
dependent on calculator

2. unknown
would have done well on algebra and probability
struggled on some geometry, measurement, statistics
overlook some necessary details

3. male
well trained in number sense
not quite mastered abstract thinking
good, but shallow understanding of methods
good at basic procedures
trouble with novel or creative processes
lack of endurance: start off well, but lack confidence and organization if faced with complex prb
not mature enought to check solutions for reasonability
skills are there, but concept of why are not
has trouble explaining results or interpreting results

4.unknown
difficulties in translating from English to Mathematics
difficulties in choosing the correct operation and the order of operations
difficulties in recalling the correct formula to use

5. unknown
not have the skills to pass in 9th grade year
does the required homework
takes notes in class
math concepts don't come easy
very little experience in geometry
working with exponents a challenge
little experience working with probability
good number sense
able to work with fractions and percent
multi-step problems a challenge
makes minor mistakes when in a hurry
does well when has examples to imitate

6. unknown
math vocabulary limited
dependent on calculator
evaluating and synthesizing skills low
poor reading skills and low vocabulary
will not use algebraic methods, guess check in stead
higher test anxiety
ld in math
lower motivation
expectation of failure
will not check answers for reasonableness
desire to finish asap
careless mistakes
overlook directions

7. unknown
competent in skills I am teaching at the moment
basics grasped
unsuccessful with complex problems
cannot generalize application

8. male
able to work problems in class when taught
gets it when explained
get many skills confused at later recall
gets the wrong answer a majority of the time

9. unknown
master skill if taught recently
pictures helpful
real-life problem with no diagram or picture much more difficult
solve most postive integer problems
multi-step problems more difficult

10.female
an A transition class student
strong basic skills at rote problems
difficulty with multistep problems
difficulty with application problems (generalizability)
some test taking skills
weak in math vocabulary
recalls previously taught topics after examples
probably not recall formulas on her own

11.unknown
pretty good skills on straight forward questions
not so good on problems that are a little different (generalizabiltiy)

12. unknown
proficient with integer arithmetic
can do well with straight forward problems
needs very concrete and simple application problems
fair estimation skills
good at using formulas
doesnt always know what formulas to use, especially in application problems
3=d figures are difficult
symbol manipulation, equations mastered at 80% level
negative numbers a problem
3 step equations a problem
strong in measurement
needs to be prompted to convert units
strong in ratios and proportions
non routine problems quite difficult (generalizability)
does not possess deep understanding of mathematical ideas

13. unknown
would need a calculator for success
would have the most difficulty with the wordy problems
difficulty with going from English to Algebra
would probably not get full credit on long answer items
would not interpret frequency tables correctly

14. male
familiar with test content
have trouble recalling formulas
make computation errors even though he used a calculator
would not make sure his answer matched what the question was asking
may leave off labels on the answers
does well on short term knowledge

15. unknown
concrete skills
problems with story problems
basic skills are poor
relies on calculator for accuracy

16. unknown
basic skills not easily retrieved

17. male
trys hard
lacks many skills
doesnt pay attention to details
prone to making simple mistakes
more concrete than abstract

18. male
does well with basic skills and concepts
few complex skills
straight forward questions easy
open ended questions more difficult

19. unknown
difficulty with abstract concepts
needs support on absract concepts
prone to make careless errors
student with support can get a c-c+ on 9th grade algebra

20. unknown
confident on problems that do not require reading
confident on problems that do not require analysing
math skills very good
problem solving skills a struggle
take all allotted time on short and long answer items

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